The invention claimed is:

1. A dendritic polymer network compound comprising at least one sensory group and interdendritic cross-linking segments of alternating conjugated double and triple bonds.

2. A compound of claim 1, wherein the alternating conjugated double and triple bonds are formed by intermolecular polymerization of diacetylene-functionalized dendritic precursors.

3. A compound of claim 2, wherein the dendritic precursor is a dendrimer.

4. A compound of claim 2, wherein the dendritic precursor is a hyperbranched polymer.

5. A compound of claim 2, wherein the dendritic precursor is a hyperbranched polymer having an average degree of branching from about 0.25 to about 0.45.

6. A compound of claim 2, wherein the dendritic precursor is a dendron.

7. A compound of claim 2, wherein the dendritic precursor is a dendrigraft.

8. A compound of claim 2, wherein the dendritic precursor is a dendronized linear polymer.

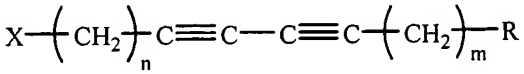
9. A compound of claim 2, wherein the dendritic precursor is a tecto-dendrimer.

10. A compound of claim 1, wherein the sensory group is attached directly to a dendritic segment of the compound.

11. A compound of claim 1, wherein the sensory group is attached to a dendritic segment of the compound through a spacer.

12. A compound of claim 11 where the spacer through which the sensory group is attached to the dendritic segment comprises a diacetylene or polydiacetylene moiety.

13. A diacetylene functionalized dendritic compound obtained by reaction of a dendritic polymer with a diacetylene reagent having the following general formula:



wherein X is a group that reacts with one or more end groups of the dendritic polymer; R is a sensory group, a linker, an unreactive organic functional group or a group that is less reactive than X; n and m are integers.

14. A compound of claim 13 in which X is Cl-, Br-, I-, p-tosyl, mesyl, acryloxy, isocyanato, epoxy, $CH_3OC(O)$-, ClC(O)-, N-hydroxysuccidimyl-C(O)-, pentafluorophenoxy-C(O)- or p-nitrophenoxy-C(O)-.

15. A compound of claim 13 in which n is 0 to 25.

16. A compound of claim 13 in which m is 0 to 25.

17. A compound of claim 1 derived from a dendritic polymer which has only one type of reactive end-group.

18. A compound of claim 17 in which the dendritic polymer has $-NH_2$ end-groups.

19. A compound of claim 1 derived from a dendritic polymer which has a mixture of two or more types of reactive end-groups.

20. A compound of claim 19 in which the dendritic polymer has a mixture of $-NH_2$ and -OH end-groups.

21. A compound of claim 20 in which the dendritic polymer is a polyamidoamine (PAMAM) dendrimer.

22. A compound of claim 20 in which the PAMAM dendrimer has a mixture of 50% $-NH_2$ end groups and 50% -OH end groups.

23. A compound of claim 20 in which the PAMAM dendrimer has a mixture of 25% $-NH_2$ end groups and 75% -OH end groups.

24. A compound of claim 1, wherein the sensory group is selected from the group consisting of peptides, carbohydrates, nucleic acids, biotin, avidin, histamine, chromophores, antigens, antibodies, enzymes, chelating compounds, molecular recognition complexes, ionic groups, polymerizable groups, linker groups, electron donors, electron acceptors, hydrophobic groups, hydrophilic groups, receptor binding groups, antibodies, and combinations thereof.

25. A method of detecting and/or quantifying the amount of an analyte in a sample, comprising:

contacting a sample that is to be analyzed for a particular analyte with a chemical and/or biological sensing material of claim 1.

26. The method of claim 25 where the sensing material is imbedded in or deposited on a solid substrate.

27. The method of claim 26 where the substrate is glass, quartz, silicon, other metals, wood, plastic, paper, cellulose or nitrocellulose.

28. The method of claim 25 in which detection is achieved by means of a visible color change.

29. The method of claim 25 in which quantitative detection is achieved by means of a color change measured with an ultraviolet/visible spectrometer.

30. The method of claim 25 in which detection is achieved by means of a change in fluorescent properties.